

Case No.: KMG1097-US1

What is claimed is:

1. A piping elbow, comprising:
a substantially cylindrical body having a first end, a second end, and an inside diameter;
5 a tangential inlet attached to the body near the first end and having an inside diameter smaller than the inside diameter of the body; and
a tangential outlet attached to the body near the second end and having an inside diameter smaller than the inside diameter of the body.
2. A piping elbow according to Claim 1, wherein the tangential inlet and the
10 tangential outlet are axially oriented in substantially opposite directions.
3. A piping elbow according to Claim 1, wherein the tangential inlet and the tangential outlet are axially oriented at about 90 degrees to each other.
4. A piping elbow according to Claim 1, wherein the tangential inlet and the tangential outlet are axially oriented in substantially the same direction.
- 15 5. Use of the piping elbow of Claim 1, for conveying a fluid flow comprising a particulate-laden gas.
6. Use of the piping elbow according to Claim 5, wherein the gas in the particulate-laden gas comprises chlorine.
7. Use of the piping elbow according to Claim 5, wherein the particulate
20 comprises titanium dioxide.
8. A piping elbow, comprising:
a substantially cylindrical body having a first end and a second end, wherein at least one of the ends is removably attached;
a tangential inlet attached to the body near the first end and having a diameter
25 smaller than the diameter of the body; and
a tangential outlet attached to the body near the second end and having a diameter smaller than the diameter of the body.
9. Use of the piping elbow of Claim 8, for conveying a fluid flow comprising a

particulate-laden gas.

10. Use of the piping elbow according to Claim 9, wherein the gas in the particulate-laden gas comprises chlorine.

11. Use of the piping elbow according to Claim 9, wherein the particulate
5 comprises titanium dioxide.

12. A piping elbow, comprising:

a substantially cylindrical body having a first end and a second end, wherein at least one of the ends is removably attached, and wherein the body contains a removable
liner;

10 a tangential inlet attached to the body near the first end having a diameter smaller than the diameter of the body, wherein the tangential inlet contains a removable liner; and

a tangential outlet attached to the body near the second end having a diameter smaller than the diameter of the body, wherein the tangential outlet contains a removable
15 liner.

13. A piping elbow according to Claim 12, wherein the tangential inlet liner and the tangential outlet liner are each inserted into a cavity in the body liner.

14. A piping elbow according to Claim 12, wherein the body liner, the tangential inlet liner, and the tangential outlet liner are made of ceramic.

20 15. A piping elbow comprising two substantially-identical components, wherein each component comprises:

a substantially cylindrical body section having an open first end and a second end;

a tangential inlet or tangential outlet attached to the body section near the
25 second end.

16. A piping elbow according to Claim 15, wherein the components are removably attached at the first end of each component.

17. A piping elbow according to Claim 15, wherein the body section contains a

liner and the tangential inlet or tangential outlet contains a liner.

18. A piping elbow according to Claim 17, wherein the liners are made of ceramic.

19. A method for adding a liner to a piping elbow having a body with an open
5 end, having a tangential inlet, and having a tangential outlet, comprising the steps of:
inserting a liner having a first cavity and a second cavity into the body through
the open end;
inserting a liner through the tangential inlet and into the first cavity; and
inserting a liner through the tangential outlet and into the second cavity.

10 20. A method according to Claim 19, wherein the liners are ceramic.

21. A method for changing the direction of a fluid flow through a conduit,
comprising the steps of:
passing the fluid flow in a first direction into a substantially cylindrical
conduit section through a tangential inlet thereof, whereby the fluid flows both
15 rotationally and axially toward a tangential outlet of the substantially cylindrical conduit
section; and

passing the fluid out of the substantially cylindrical conduit section through
the tangential outlet in a second direction.

22. The method of Claim 21, wherein the first direction and second direction are
20 substantially the same.

23. The method of Claim 21, wherein the first direction and second direction are
substantially opposite.

24. The method of Claim 21, wherein the first direction and second direction form
an angle of about 90 degrees.

25 25. The method of Claim 21, wherein the fluid flow comprises a particulate-laden
gas.

26. The method of Claim 25, wherein the particulate comprises titanium dioxide.

27. The method of Claim 25, wherein the gas in the particulate-laden gas

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comprises chlorine.